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ECONOMIC INTELLIGENCE REPORT

THE SUPPLY OF PETROLEUM IN THE SOVIET FAR EAST

CIA/RR 145
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CENTRAL INTELLIGENCE AGENCY

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ECONOMIC INTELLIGENCE REPORT

THE SUPPLY OF PETROLEUM IN THE SOVIET FAR EAST

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(ORR Project 25.1917)

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[redacted]

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THE SUPPLY OF PETROLEUM IN THE SOVIET FAR EAST*

Summary

The Soviet Far East (Economic Region XII**) is a remote but strategically important region of the USSR. The only production of crude oil in this region -- the only such production east of Central Asia (Economic Region Xb) -- takes place on Sakhalin Island. Production on Sakhalin is not great, however, and in 1957 it was necessary to transport from the western USSR approximately 66 percent of the petroleum products and 23 percent of the crude oil consumed in the region.

Production of crude oil in the Soviet Far East is estimated to have increased from 0.5 million metric tons*** in 1940 to approximately 1.2 million tons in 1957. Goals have been set at approximately 1.5 million tons for 1960 and approximately 2.5 million tons for 1965. The goal for 1960 may be reached by increasing the use of modern technological methods, but the goal for 1965 will be difficult to attain unless important deposits of oil are discovered.

Civil consumption of petroleum products in the Soviet Far East has increased steadily, amounting to approximately 1.7 million tons in 1957. In addition, military consumption accounted for approximately 1.5 million tons in that year, representing about 10 percent of total military consumption in the USSR, and can be expected to increase with the expansion of military activities in the Soviet Far East. Production by the local refineries, amounting to approximately 1.1 million tons in 1957, thus fell far short of requirements in the region, and the deficit in petroleum products of approximately 2.1 million tons was met by shipments from the western USSR. This deficit probably will continue to increase each year. The deficit of crude oil and petroleum products in the Soviet Far East in 1955 and 1957 is shown in Table 1.****

The two refineries in the Soviet Far East, which are located at Khabarovsk and Komsomol'sk, have a combined capacity for refining crude

* The estimates and conclusions contained in this report represent the best judgment of ORR as of 1 June 1958.

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*** Tonnages are given in metric tons throughout this report.
**** Table 1 follows on p. 2.

Table 1

Deficit of Petroleum in the Soviet Far East a/
1955 and 1957

Thousand Metric Tons

Item	1955	1957
Crude oil		
Total amount charged to refineries	1,300	1,300
Less: Amount charged to refineries from local production b/	830 c/	1,000 d/
Deficit e/	500	300
Petroleum products		
Consumption		
Civilian	1,500	1,700
Military	1,300	1,500
Total consumption	2,800	3,200
Less: Local production	1,100	1,100
Deficit e/	1,700	2,100
Total deficit e/	2,200	2,400

a. All data are rounded to two significant digits. Totals are derived from unrounded data and do not always agree with the sums of the rounded components. The flow of crude oil and petroleum products is shown graphically on the chart, Figure 1, following p. 2.
b. Sakhalin Island is the only source of crude oil in the Soviet Far East.
c. Production of 950,000 tons less loss and consumption at the source of 120,000 tons.
d. Production of approximately 1.2 million tons less loss and consumption at the source of 170,000 tons.
e. The deficit is met by shipments from the western USSR.

Origin of Petroleum in the Soviet Far East, 1957

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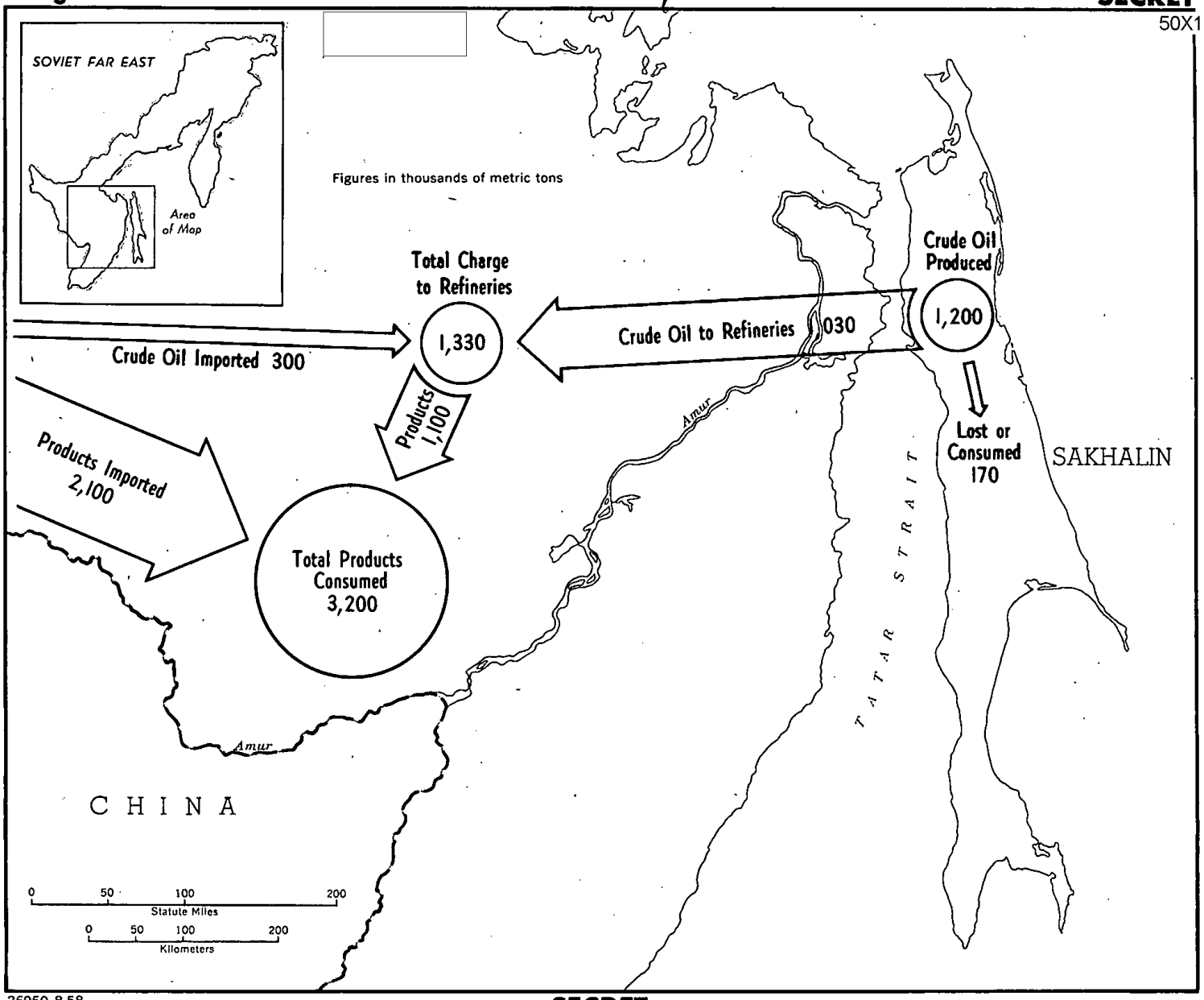

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Figure 1

oil estimated at approximately 1.3 million tons annually. Local supplies of crude oil have had to be supplemented by shipments from the western USSR. The fulfillment of the goal for production in 1960, however, would enable these refineries to operate entirely on crude oil from Sakhalin.

Plans have been announced for a new refinery at Raychikhinsk [redacted] which is scheduled to be completed in 1965. A crude oil pipeline that is to be built from Tuymazy to Raychikhinsk will supply the new refinery with crude oil from Bashkirskaya ASSR. This refinery will provide the Soviet Far East with additional supplies of petroleum products estimated at 2.4 million tons annually after 1965. By that time, however, consumption in the region may have increased by 1.5 million tons or more, and there would remain a deficit of considerably more than 1 million tons of petroleum products. Consumption probably will continue to increase at a faster rate than production, and the mounting deficit must be met by shipments via the limited facilities for transportation from the western USSR. 50X1

I. Introduction.

The Soviet Far East, as defined in a recent Soviet economic geography, consists of Khabarovskiy and Primorskiy Krays and Kamchatskaya, Magadanskaya, and Sakhalinskaya* Oblasts, which comprise Economic Region XII. 1/** This region covers one-seventh of the territory of the USSR but contained only about 2 percent of the population in 1956. This population is centered primarily at industrial establishments and military installations within the Amur-Ussuri corridor. Production of crude oil in the region is limited to Sakhalin Island.***

The importance of the region lies in its strategic position. Military facilities, including air bases, guided missile installations, and the Soviet Pacific Fleet, are being expanded, thus increasing the requirements for petroleum products. These requirements exceed production in the Soviet Far East, which therefore must be supplemented by supplies from the western USSR shipped over the Trans-Siberian Railroad or by tanker from the Black Sea. Furthermore, Communist China depends on the

* Sakhalinskaya Oblast is the administrative subdivision for Sakhalin Island.

[redacted] 50X1

*** Facilities of the petroleum industry of the Soviet Far East are shown on the map, Figure 2, inside back cover.

USSR for at least one-half of the petroleum which it consumes. This petroleum must be furnished from the Soviet Far East or shipped over the same limited facilities for transportation that serve the Soviet Far East. The Minister of the Petroleum Industry displayed his concern over the supply of petroleum in this region when he stated that the main task in the Sixth Five Year Plan (1956-60) is to increase the efficiency of geological research and of geophysical and prospecting work to locate new sources of oil and gas, particularly in Siberia and the Soviet Far East. 2/

II. Production and Exploration.

A. Crude Oil.

1. Production.

Because of their great strategic importance, the development of the oilfields on Sakhalin would be expected to receive high priority. Nevertheless, development has progressed very slowly, and not until 1956 did production of crude oil reach 1 million tons. The remoteness of the area and the severity of the climate have been largely responsible for poor results in the past, but these factors are being overcome gradually, and production in 1960 is scheduled to exceed that in 1955 by 60 percent.

As of December 1947, reserves on northern Sakhalin were estimated at approximately 34 million tons, of which 9 million tons were regarded as proved and 25 million tons as probable, and another 7.8 million tons were regarded as possible. 3/ In 1957 a Soviet source referred to total reserves on northern Sakhalin as several hundred million tons. 4/ This figure must include purely speculative reserves in the entire Okhotsk geosyncline, a strip extending nearly 200 miles along the east coast of northern Sakhalin and out into the Sea of Okhotsk.

The estimated production of crude oil in the oilfields on Sakhalin in 1940 and in selected years, 1950-57, and planned production in the years 1958, 1960, and 1965 is shown in Table 2.*

2. Principal Oilfields.

The oilfields on Sakhalin, which are under the supervision of the Far East Oil Union, are located along the east coast of the island north of the 50th parallel. The individual oilfields are small,

* Table 2 follows on p. 5.

Table 2

Estimated Production of Crude Oil on Sakhalin Island
Selected Years, 1940-65

Thousand Metric Tons

Year	Amount
1940	500 a/
1950	645 b/
1952	720 c/
1953	776 d/
1954	857 e/
1955	950 f/
1956	1,050 g/
1957	1,191 h/
1958	1,282 i/
1960	1,520 j/
1965	2,460 k/

a. 5/
b. Production in 1954 was reported to have exceeded production in 1950 by 32.8 percent. 6/
c. Production in 10 months of 1953 was reported to have exceeded production in the same period of 1952 by 7.8 percent. 7/ It is assumed that the percentage increase for the entire year was the same as that for the 10-month period.
d. Production in 1954 was reported to have exceeded production in 1953 by 10.4 percent. 8/
e. Production in 1955 was reported to have exceeded production in 1954 by 10.9 percent. 9/
f. 10/
g. Estimated. For methodology, see Appendix A.
h. Production in 1957 was reported to have exceeded production in 1953 by 53.5 percent. 11/
i. Planned. Production of crude oil is scheduled to increase 7.6 percent in 1958. 12/
j. Planned. The Sixth Five Year Plan (1956-60) provided for an increase of 60 percent in production of crude oil. 13/
k. Planned. The plan for the 7-year period 1959-65 provides for an increase of 92 percent in production of crude oil. 14/

and the shallow wells -- few of which reach a depth of 3,000 feet -- generally require pumping. In the fall of 1957, there were reportedly 2,000 oil wells on Sakhalin 15/ producing an average of about 12 barrels per well per day. This amount is equal to the average daily production per well in the US but represents only about one-fifth of the average daily production per well in the USSR. 16/ The cost of producing crude oil on Sakhalin is 2 or 3 times greater than in other areas of the USSR.

The oldest oilfield on Sakhalin is at Okha, where production began in 1923. 17/ The Ekhabi oilfield, which is located about 4 miles southeast of the town of Okha, began producing in 1936, and by 1941 accounted for more than one-half of all production on Sakhalin. 18/ The crude oil from Ekhabi is of a high quality, but the crude oil from Okha is heavier, containing a much smaller percentage of light products and a larger percentage of residual products. In 1947, commercial production began at the Vostochnyy (East Ekhabi) oilfield, which is east and south of the Ekhabi oilfield. 19/ The Ekhabi and Vostochnyy oilfields have been relatively productive and have consistently fulfilled their plans for production ahead of schedule. 20/

The fourth major oilfield is located at Katangli, 120 miles south of Okha. Production of crude oil at Katangli, which began about 1938, has been considerably less than production at the other three oilfields. In 1946, before production began at Vostochnyy, 68 percent of the crude oil from Sakhalin was produced at Ekhabi, 24 percent at Okha, and the remaining 8 percent at Katangli. 21/

Since 1953 two new oilfields on Sakhalin have been organized as producing enterprises. The Paromay oilfield, which is located about 50 miles south of Okha, had been explored as early as 1930. Paromay had no easy means of access, however, until it was linked with Okha by rail, and the oilfield probably did not go into production until 1953. The Paromay Oil Production Section of the Far East Oil Union was reported to be "operating with good results" during 1956. 22/ The total productive area of the oilfield at Paromay, however, is believed to be smaller than that of the other oilfields, and production probably is not great.

In August 1957, after 6 years of explorational drilling, an oil production section was organized in the vicinity of Sabo to develop the deposits of oil discovered by the Sabo Oil Prospecting Section. 23/ Sabo is located midway between Okha and Paromay and, like Paromay, is reached by the Okha-Katangli Railroad.

3. Prospecting Activity.

Prospecting organizations are continuing the search for new oilfields in a number of areas on Sakhalin. Exploration has been reported in the last 2 years at Nutovo, Pil'tun, Sabo, and Tungor, all located along the east coast between Okha and Katangli. 24/ It appears that the oilfield at Sabo began producing in August 1957, because an oil production section was established and the Sabo Oil Prospecting Section was abolished at that time. A new Malaya Sabo Oil Prospecting Section was organized, 25/ probably west of Sabo in the vicinity of the Malaya Sabo River. The Nutovo Prospecting Section was abolished in September 1957, and all drilling operations were turned over to the Pil'tun Prospecting Section. 26/ This move may reflect unsatisfactory results in the Nutovo area. A new area was reported under exploration in 1956 at Nekrasovka, about 20 miles northwest of Okha. Two new drilling rigs designed for drilling deep prospecting wells were received by the Far East Prospecting Union in 1956. 27/ One of these rigs was being operated at Sabo, and the other at Nekrasovka. In December 1956 a new oilfield was reported opened when oil of high quality began flowing from a prospecting well in the Nekrasovka Prospecting Section. 28/ Other localities along the east coast have been investigated, but no reports of prospecting have been noted in recent years.

The survey and exploitation of undersea oilfields reportedly is being conducted under the Sixth Five Year Plan. 29/ The water along the east coast of Sakhalin slopes to a depth of 200 meters at a distance of 50 to 70 kilometers from shore. Northern Sakhalin is icebound in winter, and in the few summer months when the sea is free of ice there are strong winds and heavy seas. It may be possible to drill directional wells from onshore locations out to a maximum distance of one mile, thus achieving a relatively small increase in production of crude oil. Any important increase in offshore production of crude oil would necessitate offshore drilling further out at sea, which would be extremely hazardous in view of the climatic conditions and the water depths encountered over most of this area.

There are oil-bearing deposits on both the east and west coasts of Kamchatka, and prospecting has been conducted there on a small scale since the early 1920's. There has been no evidence of activity there in recent years, however, and it is believed that efforts have been suspended, at least for the present, as unprofitable.

4. Technological Developments.

A complete reconstruction of the old Okha Oil Production Section was accomplished during the years 1950-55. Modern drilling

rigs were installed, and wooden derricks were replaced by metal ones. 30/ Most of the wells at Okha are old, and in order to increase their productivity, a number of geological-technical measures have been undertaken, 31/ including the use of turbine drills and secondary methods of exploitation.

The use of turbine drills, which was initiated on Sakhalin in the early 1950's, has greatly increased the amount of drilling, at the same time reducing its cost. In 1953, only 34 percent of all the drilling was done by the turbine method; in 1954, 74 percent; and in 1955, 90 percent. 32/

Secondary methods of exploiting deposits of oil have been put into wide use in all of the producing oilfields on Sakhalin since 1951. Air and gas have been pumped into the wells to maintain pressure, and a system of hydraulic breaching* of the oil-bearing stratum with an emulsion of oil and sand, which was first performed in 1954, has proved very effective. 33/ During 1955 the Ekhabi and Vostochnyy Production Sections performed more than 85 hydraulic breachings, and the Okha Production Section began to use this new technique. 34/ Experience at Ekhabi showed that this method of recovery increased the effectiveness of operations 5 to 8 times. 35/ In 1956 a total of nearly 20,000 tons of oil was produced as a result of the use of hydraulic breaching of the stratum. 36/ This technique does not yield effective results in loose-type deposits, such as the Katangli oilfield, however, and in some deposits in the Okha oilfield. 37/ The Okha Production Section has made more effective use of the pumping of air and gas into the stratum and pumped water into the oil zone for the first time in 1956. 38/ In that year, 3.7 million cubic meters more gas and air were pumped into the stratum than in 1954, thus increasing production by 32,000 tons. 39/

Other technical innovations in the oilfields on Sakhalin include the heating of the oil-producing zone around the well with electric heaters, the deparaffinization of the wells with spiral scrapers, and contour flooding of the deposits of oil. 40/ In recent years the oilfields have received a large quantity of new machinery and equipment, including modern pumping equipment to replace outdated pumping jacks. 41/

The inauguration of modern technical methods obviously has borne fruit in the oilfields on Sakhalin. By exceeding its plans for production of crude oil and gas in 1954 and 1955, the Far East Oil Union compensated for failure to achieve its goals during the first 3 years of the Fifth Five Year Plan (1951-55). 42/ In 1956, instead of the great losses incurred previously, the Far East Oil Union made a

* In the US this technique usually is known as hydraulic fracturing.

profit of almost 6 million rubles.* 43/ A strenuous effort is being made to reduce the costs of production and to increase the productivity of labor. During 1956 and 1957 the Far East Oil Union was revising the administrative structure of some of its components, eliminating some enterprises, and merging other operations, thereby eliminating duplication and reducing costs. 44/ These measures have served to reduce the cost of producing crude oil on Sakhalin by 15 rubles a ton. 45/

B. Natural Gas.

Little use was made of gas in the oilfields on Sakhalin until after 1950, although some gas was being produced at Okha as long ago as the early 1930's. In 1953 a gas pipeline 18 kilometers long was built from Gilyako-Bunan to Okha, and gas was being used in homes. 46/ The gasification of the city of Okha was completed in 1957, and gas was being piped into other towns. 47/ By 1957, additional gas pipelines had been built in order to exploit the deposits of gas at Ekhabi, Vostochnyy, Sabo, and Erri, and a program for constructing a number of new main gas pipelines was planned for the next few years. 48/ The real significance of the increased production of gas on Sakhalin is its wide use for pumping into the oil-bearing strata and its use in the oilfields as fuel in place of oil, 49/ thus increasing the volume of deliveries of crude oil.

The estimated volume of production of gas at the oilfields on Sakhalin is shown in Table 3.**

III. Refining.

A. Natural Crude Oil Refineries.

The processing of crude oil in the Soviet Far East is carried on at 2 major refineries, 1 at Khabarovsk and 1 at Komsomol'sk. In addition, there is a small topping plant at Okha on Sakhalin which was built in 1932 50/ and has an estimated capacity of not more than 40,000 tons.

The refinery at Khabarovsk [redacted] which began operating in 1935, was equipped with the first combination straight-run distillation and thermal cracking unit in the USSR. This refinery was designed originally to process about 226,000 tons of crude oil a year, yielding gasoline, naphtha, kerosine, gas oil, and residual fuel oil. 51/ In August 1955, on the occasion of the 20th anniversary of the opening of

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* Approximately US $1.5 million at the official rate of exchange, 4 rubles to US $1, which is not necessarily an accurate reflection of the dollar value.

** Table 3 follows on p. 10.

the refinery, its capacity was reported to have increased 2.8 times. 52/ Such an increase would indicate an annual capacity of 630,000 tons at that time.

Table 3

Estimated Production of Natural Gas on Sakhalin Island
Selected Years, 1945-65

Million Cubic Meters

Year	Amount
1945	68.4 a/
1950	85.1 a/
1955	193.0 a/
1956	229.0 b/
1957	260.0 c/
1958	295.0 c/
1960	380.0 d/
1965	560.0 e/

a. 53/
b. 54/
c. Interpolated, using an average annual increase of 13.5 percent.
d. Planned. The Sixth Five Year Plan (1956-60) provided for an increase of nearly 100 percent in production of natural gas. 55/
e. Planned. The plan for the 7-year period 1959-65 provides for an increase of 90 percent in production of natural gas. 56/

The refinery at Komsomol'sk [redacted] began operation in the early 1940's with facilities only for primary distillation and a throughput capacity estimated at about 700,000 tons of crude oil. 57/ So far the recommendations of the Khabarovsk Economic Council for the expansion of this refinery and the addition of cracking facilities and an asphalt plant have not been implemented. 58/ 50X1

On the basis of a throughput capacity of 630,000 tons a year at the refinery at Khabarovsk and 700,000 tons a year at the refinery at Komsomol'sk, the combined annual throughput capacity would be approximately 1.3 million tons of crude oil.

Except for those quantities of crude oil that are refined for local needs in the topping plant at Okha, that are used directly as fuel, or that are lost in the oilfields, all of the crude oil produced on Sakhalin is supplied to the two refineries at Khabarovsk and Komsomol'sk. The crude oil from the oilfields at Ekhabi, which represents about 70 percent of the total production on Sakhalin, is particularly suited for processing in the type of equipment installed in the refinery at Komsomol'sk. Crude oil from Ekhabi contains about 60 percent by weight gasoline and kerosine, which are recoverable with equipment for primary distillation, 59/ and there would be no advantage in processing this type of crude oil in the cracking unit of the refinery at Khabarovsk. It is assumed, therefore, that the crude oil from Ekhabi is sent to Komsomol'sk and constitutes the principal source of supply for the refinery there. The gasoline produced at Komsomol'sk is 70 to 72 octane and is raised to 95 octane aviation gasoline by the addition of blending agents, which are imported from refineries in the western USSR. 60/ It is estimated that a minimum yield of between 20 and 25 percent of jet kerosine could be obtained from the crude oil from Ekhabi with concurrent production of other distillate products. Other products produced by the refinery at Komsomol'sk include kerosine, diesel fuel, and fuel oil. 61/

Production at the oilfields on Sakhalin is insufficient to keep both refineries in the Soviet Far East operating at capacity. The refinery at Khabarovsk probably also receives high sulfur crude oil from the Ural-Volga area, which is the most convenient alternate source of crude oil for the Soviet Far East. The refinery apparently produces only those products which are a direct result of combined atmospheric distillation and thermal cracking operations, including gasoline, kerosine, diesel fuel, and residual fuel oil. Aviation gasoline can be produced only by the addition of blending agents, which must be imported from refineries in the western USSR. A Soviet standard for a jet fuel made from sulfurous crude oil was established in 1954, 62/ and this type of jet fuel could be produced by the refinery at Khabarovsk from crude oil from the Ural-Volga area. There is no evidence that the refinery at Khabarovsk has facilities for production of lubricating oils.

The total production of refined products by the refineries in the Soviet Far East is estimated at between 85 and 90 percent of the crude oil received by these refineries, or about 1.1 million tons a year.

B. Synthetic Fuel Plants.

There are two small low-temperature carbonization plants, located on southern Sakhalin at Gornozavodsk and Uglezavodsk, which were taken over from the Japanese. These plants, which produced only negligible quantities of low-grade products, are reported to have discontinued operations. 63/

IV. Transportation.

Transportation has been one of the major problems in developing the oilfields on the island, affecting both the importation of supplies and equipment to Sakhalin and the exportation of crude oil. The ports of northern Sakhalin are closed to navigation for approximately one-half of the year because of ice. When the transfer of crude oil was limited to transportation by sea, the refineries at Khabarovsk and Komsomol'sk sometimes were forced to close down in the late winter when their supplies of crude oil had been exhausted.

During World War II, construction was begun on a pipeline to carry crude oil from Sakhalin to the refineries on the mainland. The pipeline runs from Okha to Pogibi, then across the Tatar Strait to Lazarevka, and terminates at Komsomol'sk, a distance of about 600 kilometers. 64/ The construction of this pipeline through rugged and wild terrain and across 10 kilometers of open water was extremely difficult, but the project is believed to have been completed by 1953. This pipeline probably is 12 inches in diameter and capable of carrying at least 1 million tons of crude oil annually. The completion of this pipeline was a major step in the development of the petroleum industry of the Soviet Far East.

Poor facilities for transportation on northern Sakhalin have been a further hindrance to the development of new oilfields. The entire east coast between Okha and Katangli is a potential source of crude oil, but the lack of facilities for transportation has greatly retarded explorational operations. In the early 1950's, construction was underway on a narrow-gauge railroad along the coast. This was another difficult undertaking but a necessary one for the future progress of the oil industry. [redacted] October 1951, the railroad appeared to be completed as far as Paromay but not yet in regular use. 65/ South of the Paromay River there were numerous incomplete bridges, and construction was still in progress. Construction also was underway in the vicinity of Nogliki, at the southern end of the line. The railroad is believed to have been in partial operation by 1953 and was reported to have been operating well in 1956. 66/

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Crude oil from Katangli is pumped through a short pipeline to Nabil' Bay. From that point the oil is hauled by tanker to Moskal'vo and then by barge up the Amur River to Komsomol'sk. 67/ The fact that such transportation is possible only in the summer months serves to limit production at Katangli, where the crude oil must be stored in tanks during the winter. There has been no indication that this crude oil is transported over the narrow-gauge railroad to Okha or that these facilities are adequate to handle such shipments by rail.

V. Consumption and Supply-Demand Balance.

The estimated civil consumption of petroleum products in the Soviet Far East is shown in Table 4.* Although industrial development in the area is not great, civil consumption of petroleum products in the Soviet Far East in 1957 represented 2.7 percent of the civil consumption of petroleum products in the entire USSR. 68/ Inasmuch as the region contains only 2 percent of the population of the USSR, the consumption of petroleum products per capita is above average. This higher rate of consumption is accounted for by the substantial requirements for fuel of the merchant fleet. Other principal consumers of petroleum in the area are motor transport, agriculture (which includes the fishing industry), and the construction industry. The distribution of civil consumption of petroleum products, by principal products, is shown in Table 5.**

Military consumption is estimated to have amounted to 1.3 million tons in 1955 and approximately 1.5 million tons in 1957.*** These figures represent approximately 10 to 15 percent of the total military consumption in the USSR. The Navy accounts for more than 55 percent of such consumption in bunkering the Pacific Fleet, and the Air Force for 35 to 40 percent.

Combined civil and military consumption of petroleum products in the Soviet Far East amounted to approximately 2.8 million tons in 1955 and 3.2 million tons in 1957. Inasmuch as production of refined products in the Soviet Far East is estimated at 1.1 million tons annually, the deficit in the Soviet Far East amounted to approximately 1.7 million tons in 1955 and 2.1 million tons in 1957.

The crude oil that reaches the refineries on the mainland is believed to represent 85 to 90 percent of the total production of crude oil on Sakhalin. In 1955, when production of crude oil on Sakhalin

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* Table 4 follows on p. 14.
** Table 5 follows on p. 15.
*** For methodology, see Appendix A.

Table 4

Civil Consumption of Petroleum Products
in the Soviet Far East, by Consumer a/
1953-57

Thousand Metric Tons

Consumer	1953	1954	1955	1956	1957
Transport					
Merchant fleet	370	400	430	460	470
Motor transport	190	220	250	280	320
Civil air fleet	21	23	25	25	27
Railroads	5	6	6	6	7
Inland waterways	4	4	6	8	14
Total transport	590	650	720	780	840
Agriculture	200	220	230	250	240
Construction	190	230	240	270	300
Industry					
Electric power	63	72	79	86	93
Petroleum	50	55	49	57	65
Steel	36	39	43	48	51
Nonferrous and manufacturing	30	39	45	41	41
Coal	7	7	8	9	9
Total industry	190	210	220	240	260
Household	25	30	35	42	50
Grand total	1,200	1,300	1,500	1,600	1,700

a. 69/. All data are rounded to two significant digits. Totals are derived from unrounded data and do not always agree with the sums of the rounded components.

Table 5

Civil Consumption of Petroleum Products
in the Soviet Far East, by Product a/
1953-57

Thousand Metric Tons

Product	1953	1954	1955	1956	1957
Fuel oil	400	440	440	460	460
Gasoline	220	250	280	310	350
Kerosine	200	220	230	250	250
Diesel fuel	160	200	230	280	330
Road oils and asphalt	120	140	150	160	180
Lubricants	86	98	110	120	180
Total	1,200	1,300	1,500	1,600	1,700

a. 70/. All data are rounded to two significant digits. Totals are derived from unrounded data and do not always agree with the sums of the rounded components.

amounted to 950,000 tons, the deficit amounted to approximately 500,000 tons; in 1956, to approximately 400,000 tons; and in 1957, to approximately 300,000 tons. Therefore, the amount of crude oil and refined products that had to be transported to the Soviet Far East was approximately 2.2 million tons in 1955 and 2.4 million tons in 1957.

VI. Prospects Through 1965.

There have been numerous indications that the Far East Oil Union is not anticipating the discovery of any important oilfields. In November 1955 the Chief of the Oil and Gas Production Department stated that an increase in production of crude oil on Sakhalin depends largely on the use of advanced methods of exploiting deposits of oil, the most important method being the hydraulic breaching of the stratum, which permits fuller utilization of resources of oil. 71/ In September 1956 it was stated that 82 percent of the crude oil produced on Sakhalin under the Sixth Five Year Plan (1956-60) must be obtained from existing deposits by means of artificially influencing the oil-bearing strata. 72/ In June 1957 an official of the Far East Oil Union stated that the primary task is to increase the productivity of the working wells. 73/

Production of crude oil in 1960 is scheduled to exceed that in 1955 by 60 percent. 74/ Fulfillment of this goal will require an increase in production of a little more than 100,000 tons annually for the next 3 years, an average rate of 9.9 percent. Although this rate of increase exceeds that achieved during the past 5 years, which averaged 8.1 percent, the goal appears to be feasible.

Production of crude oil in 1965 is scheduled to exceed that in 1958 by 92 percent. 75/ To attain this goal, production must increase almost 200,000 tons annually, an average rate of 10 percent, between 1960 and 1965. Such an increase would require the maximum utilization of modern technical methods, which would greatly increase the cost of production. It was stated in the Soviet press that improvements in technology and methods of extraction had increased production of crude oil on northern Sakhalin by more than 70,000 tons in 1956. 76/ Unless new sources of oil are discovered, an increase of 200,000 tons each year probably will be difficult to attain.

The refineries in the Soviet Far East can be expected to operate exclusively on crude oil from Sakhalin by 1960 if, as estimated, the goal for production of 1.5 million tons of crude oil in that year is attained. When production of crude oil exceeds that amount, additional refining capacity will be needed to process local crude oil within the region.

The Sixth Five Year Plan (1956-60) provided for the start of construction of a refinery in Amur Oblast. Later, plans were announced for the construction of a refinery in Raychikhinsk in Amur Oblast during 1959-65. 77/ A pipeline that is to be built during 1960-65 from Tuymazy to Raychikhinsk will supply the new refinery with crude oil from Bashkirskaya ASSR. The Minister of the Petroleum Industry has announced the development of a new standard design for a refinery with a throughput capacity of 2 million to 3 million tons of crude oil a year. 78/ The new refinery at Raychikhinsk probably will be built according to this design. It is estimated that the throughput capacity of this new refinery will be approximately 2.6 million tons and that annual production after 1965 will amount to 2.4 million tons.

The directives of the Sixth Five Year Plan (1956-60) provided for the modification of the old refining facilities in the USSR in order to increase the throughput capacity by approximately 20 percent during the 5-year period. 79/ Such a modification of refineries in the Soviet Far East would increase production by 200,000 tons a year. Both civil and military consumption of petroleum products undoubtedly will continue to increase, however, at least as rapidly as they have in the past. The construction of a new refinery and the modernization of the two existing refineries will not provide for future requirements of petroleum products.

If the consumption of petroleum products in the Soviet Far East continues to increase by approximately 200,000 tons a year, as it did during 1955-57, the deficit in the area will be 2.7 million tons by 1960 and 3.7 million tons by 1965. Thus, although the new refinery at Raychikhinsk is expected to reduce the deficit by approximately 2.4 million tons when it goes into full operation after 1965, there will remain a deficit of considerably more than 1 million tons which must be met by shipments from the western USSR.

The first of a series of tankers with a cargo-carrying capacity of 25,000 tons is under construction in the USSR. Tankers of this type are scheduled for use between the Black Sea and the Far East. 80/ The capacity of these tankers will be about 2.5 times the capacity of the tankers now operating between the Black Sea and the Far East, and the new tankers will provide a cheaper means of transportation which probably will be used to supply much of the petroleum needed to meet the deficit in the Soviet Far East. In the event of hostilities, however, shipments by tanker would be halted immediately, and the fulfillment of greatly increased requirements for petroleum products in the Soviet Far East would depend on local production and on shipments over the Trans-Siberian Railroad.

APPENDIX A

METHODOLOGY

1. Production of Crude Oil on Sakhalin in 1956.*

It was announced in February 1956 that production of crude oil would be increased by nearly 10 percent in 1956, 81/ indicating a minimum increase of 9 percent and production of at least 1,035,500 tons. In February 1957, it was announced that the goal for production in 1956 was exceeded by 34,000 tons, 82/ thus indicating a possible total of approximately 1,070,000 tons. An article in the Soviet press reported in 1957 that production of crude oil in the Soviet Far East in 1956 represented 1.2 percent of the 83.7 million tons produced in the USSR, 83/ thus indicating production of 1,004,400 tons. Assuming that the percentage figure was rounded, the upper limit of 1.25 percent would amount to 1,046,000 tons. On the basis of these figures, it is estimated that production of crude oil on Sakhalin amounted to approximately 1,050,000 tons in 1956.

2. Military Consumption.**

Military consumption of petroleum products in Economic Regions XI and XII in 1955 is estimated to have amounted to 1,700,000 tons and to have been allocated as follows 84/:

Consumer	Amount (Metric Tons)
Army	150,000
Navy	750,000
Air Force	800,000
Total	1,700,000

Of this total amount, Region XII is believed to have accounted for approximately 1.3 million tons, representing the entire allocation to the Navy and 60 percent of the allocations to the Army and the Air Force.

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* See II, A, 1, p. 4, above, and also Table 2, p. 5, above.
** See V, p. 13, above.

In 1957 the Soviet Pacific Fleet is estimated to have required 71,625 tons of petroleum products each month, 85/ or 860,000 tons during the year, an increase of approximately 15 percent compared with 1955. Should total military requirements in Region XII have increased at the same rate during this period, total military consumption of petroleum products in the region in 1957 would have amounted to approximately 1.5 million tons.

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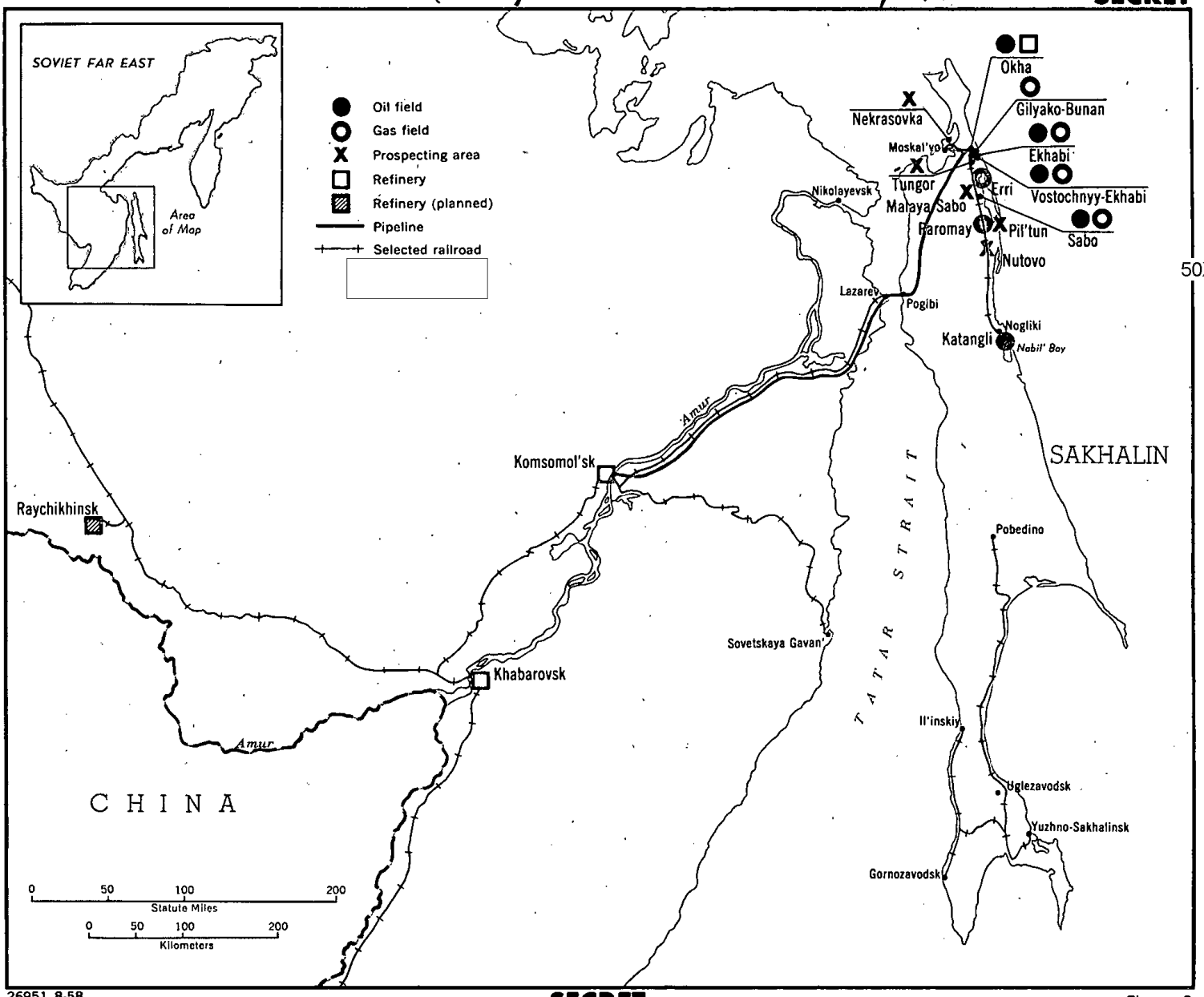

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Figure 2